EXAMINING WEB 2.0 TOOLS USAGE OF SCIENCE TEACHER CANDIDATES

Dr. Fatime BALKAN KIYICI
Sakarya University
College of Education
Science Education Department
fbalkan@sakarya.edu.tr

ABSTRACT
Using technology in a science teaching is so important. Only the person, who can use these tools in expert level, can use these tools in their teaching activities. In this research it is aimed firstly identifying science teacher candidates web 2.0 tools usage experience level and factors affecting experience level. In this research survey method was adapted. To gather research data a survey was developed. Survey contains seven sections concerning demographic data, blog, wiki, image sharing, document sharing, social network site and instant messaging usage. After reviewing literature survey developed and survey was given CEIT and science education experts to review. After expert examination survey, finalized survey administrated 289 science teacher candidates and obtained data analyzed.Research findings show that science teacher candidates experience regarding each tool fairly equal and their experience do not differ notable level by gender, computer experience or internet experience.
Keywords: Web 2.0 tools, science teacher candidates, technology, education

INTRODUCTION

Nowadays generations who are students at the schools from pre-k to universities have grown up with technology (Prensky, 2001). New generation learners are nested with technology and they use technological devices efficiently and effectively in their daily lives. Youths, who live in the developed nations, use ICT tools especially internet frequently (Kolikant, 2010). New generation prefer computer and internet firstly as research tool. Jones, Ramanau, Cross & Healing (2010) state that %70,1 of the youths feel that their computer access is sufficient and %55,6 have broadband internet connection. As can be understand from the research, most of the youths have computer and internet connection and they use these tools intensively. New generation is thought can use technological tools especially digital ones effectively than older generations (Lei, 2009). Schools offer their students more computer and internet to use and they offer without fee (Gui, Argentin, 2011). Using technology in schools is inevitable. New generation choices concerning learning and using ICT are different and they use more ICT in their learning process (Valtonen, Dillon, Hacklin &Vaisanen, 2010).The most important indicator of the transformation to new society is increasing usage of ICT, ICT usage shapes all of the societies institution (Székely & Nagy, 2011). While society turn to information society, technology is also affected and lives a transformation. For example web technologies transform to Web 2.0. Web 2.0 refers to new interfaces, which promote collaboration and user provided content (Székely& Nagy, 2011). By web transformation, today's students become more frequent internet user.

Web 1.0 sites promote that diffusion of knowledge, which are produced by experts, but web 2.0 support user contribution to knowledge and content. By transition of web, web site lives transformation from knowledge storage to information link site (Mason & Rennie, 2007). Web 2.0 applications require and support users to contribute to site, by the way users can develop content (Cifuentes, Sharp, Bulu, Benz & Stough, 2010).There many web 2.0 definitions and each of the definitions emphasize different features but generally the definitions put forth these attributes, collaboration, active involvement to content, producing knowledge and sharing ideas and information via web (Grosseck, 2009). Web 2.0 term is a broad term and it refers to new usage of WWW and it includes the tools which user can contribute, not to refer any change in technical aspects of WWW (Liu, Liu, Bao, Ju& Wang, 2010; Oliver,2007).Web 2.0 promote user-generated content, collaboration, producing and sharing new knowledge and interaction between site users (Chen, Yen & Hwang, 2012; Kitsantas & Dabbagh, 2011;Aharony, 2009). Web 2.0 associated with application like wiki, blog, podcasts, image sharing, document sharing social network sites and RSS feeds (Aharony, 2009;Ras & Rech, 2009). Online interaction become important and common (Wu, Wang, Liu, Hu & Hwang, 2012). Web 2.0 tools support online interaction. Most of the web 2.0 applications are free to user, users can access via internet, users who have basic computer skills can use this applications and share their ideas (Cain & Fox, 2009; Coutinho&Mota, 2011)The benefits of user-generated content are fairly obvious (Mason & Rennie, 2007, p:199):

- 1. Users have the tools to actively engage in the construction of their experience, rather than merely absorb content passively.
- 2. Content will be continually refreshed by the users rather than require expensive expert input.
- 3. Many of the new tools support collaborative work, thereby allowing users to develop the skills of working in teams.

- 4. Shared community spaces and inter-group communications are a massive part of what excites young people and therefore should contribute to users' persistence and motivation to learn.

When we examine MEB (2005), objectives of science and technology teaching is educating individual as science and technology literate. As separate disciplines science and technology have strong relationship. Science teachers use technology in their teaching activities as necessity. Teachers teach students who are member of new generation and these students grown up with technology, so teachers must be experts in using technological devices (Martin, Sexton and Franklin, 2009).

In this context, it is aimed firstly identifying science teacher candidates' web 2.0 tools usage experience level and factors affecting experience level. Using technology in a science teaching is so important. Only the person, who can use these tools in expert level, can use these tools in their teaching activities.

METHOD

In this research survey method was adapted. To gather research data a survey was developed. Survey contains seven sections concerning demographic data, blog, wiki, image sharing, document sharing, social network site and instant messaging usage. After reviewing literature survey developed and survey was given CEIT and science education experts to review. After expert examination survey, finalized survey administrated 289 science teacher candidates and obtained data analyzed.

Findings

Table 1 Science teacher candidates' demographic data

		Frequency	Percentage
Gender	Male	82	28,4
	Female	207	71,6
Class	1	69	23,9
	2	83	28,7
	3	68	23,5
	4	69	23,9
Internet connection place	Where they reside	202	69,9
	School	59	20,4
	Internet café	27	9,3
e-mail ownership	Yes	274	94,8
	No	4	1,4
	More than 1	11	3,8
Social network account ownership	Yes	252	87,2
	No	37	12,8
Blog account ownership	Yes	58	20,1
	No	227	78,5
Micro blogging account ownership	Yes	25	8,7
	No	249	86,2

Table 1 shows participants demographic data. as can be seen in table 1 %28,4 of the participant are male and %71,6 of the participants are female. Distribution of the participants by class is can also be seen in table 1 and participants distributed equally among four classes. Most of the participants can connect to internet where they reside and little portion or the participants use internet café to connect internet. Almost all of the participants have at least one e-mail address, just %1,4 of the participants do not have e-mail address. While %87,2 of the participants have social networking site account, just %20,1 of the participants have blog account and just %8,7 of the participants have micro blogging site account.

Table 2 Science teacher candidates' computer and internet usage experience statistics

	Computer usage	Internet usage
Mean	8,08	6,80
Median	8,00	7,00
Variance	2,83	2,67
Minimum	1	1
Maximum	16	16

Statistics related participants' computer and internet usage experience can be seen in table 2. science teacher candidates have 8,08 years compute usage experience and 6,80 years internet usage experience. Based on statistics it can be said that science teacher candidates are experienced user concerning computer and internet usage.

Table 3 Science teacher candidates' Web 2.0 tools usage experience statistics

	Blog	Wiki	Image Sharing	Document Sharing	SocialNetwork	InstantMessaging
Mean	1,8872	1,4514	2,7082	2,5156	3,7346	3,3979
Median	1,5000	1,0000	3,0000	3,0000	3,8000	4,0000
Variance	,964	,693	1,053	1,224	1,072	,800
Minimum	1,00	1,00	1,00	1,00	1,20	1,00
Maximum	4,00	4,00	4,00	4,00	4,00	4,00

Table 3 summarizes participants' web 2.0 tools usage experience level. Questionnaire contains 26 question concerning six different web 2.0 tools. To understand science teacher candidates ' expertise level based on science teacher candidates ' responses, expertise score of each tool were calculated. As can be seen in table 2, science teacher candidates ' highest average expertise score is social networking site usage and lowest average expertise score is wiki usage. Most of the science teacher candidates use social networking tools, reason why they have highest average score in social networking site usage should be this reason. On the other hand most of the science teacher candidates use instant messaging program to communicate with their relatives and friend, because of that their average instant messaging score higher than other tools. Writing blog is not a common habit among Turkish society, because of that it can be taught that science teacher candidates got second lowest average score from blog expertise questions. While most of the science teacher candidates read wiki article almost all of the wiki users are passive user they just read, because of that their wiki expertise score is lower than other tools.

Table 4 Science teacher candidates' Web 2.0 tools usage expertise level differences by gender

	Gender	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Blog	Male	80	20,67	1,02	1,890	133,239	,061
	Female	200	18,18	,92			
Wiki	Male	81	15,53	,77	,726	281	,469
	Female	202	14,83	,71			
Image Sharing	Male	81	29,26	1,00	2,099	281	,037
	Female	202	26,41	1,04			
Document Sharing	Male	82	27,62	1,06	2,077	283	,039
	Female	203	24,68	1,09			
Social Network	Male	78	37,90	1,03	,415	272	,678
	Female	196	37,30	1,08			
Instant Messaging	Male	81	32,56	,88	-1,750	283	,081
	Female	204	34,39	,76			

An independent-samples t-test was conducted to compare web 2.0 tools usage expertise level by participants' gender and results are displayed in table 4. According to the results there was a significance difference in expertise level of image sharing site usage by male participants (M=29,26, SD=1,00) and female participants (M=26,41, SD=1,04); $t_{(281)}$=2,099, p=0.037. There was a significance difference in expertise level of image document sharing site usage by male participants (M=27,62, SD=1,06) and female participants (M=24,68, SD=1.09); $t_{(283)}$=2,077, p=0.039. There was not a significance difference in blog, wiki, social network and instant message usage expertise level by gender.

Table 5 Science teacher candidates' Web 2.0 tools usage expertise level differences by internet connection site

		Sum of Squares	df	Mean Square	F	Sig.
Blog	Between Groups	4,015	2	2,007	2,193	,114
	Within Groups	252,686	276	,916		
	Total	256,700	278			
Wiki	Between Groups	2,102	2	1,051	1,978	,140
	Within Groups	148,205	279	,531		
	Total	150,307	281			
Image Sharing	Between Groups	,558	2	,279	,259	,772
	Within Groups	300,439	279	1,077		
	Total	300,997	281			
Document Sharing	Between Groups	1,187	2	,593	,501	,607
	Within Groups	333,105	281	1,185		
	Total	334,291	283			
Social Network	Between Groups	3,582	2	1,791	1,593	,205
	Within Groups	303,509	270	1,124		
	Total	307,091	272			
Instant Messaging	Between Groups	,934	2	,467	,733	,481
	Within Groups	179,102	281	,637		
	Total	180,036	283			

To understand is there any differences in web 2.0 tools usage expertise level by internet connection site One Way Anova test was run and results summarized in table 5. Other tools usage expertise level there is no significance difference by internet connection site.

Table 6 Science teacher candidates' Web 2.0 tools usage expertise level differences by computer usage experience

		N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Blog	Inexperienced	160	17,63	,90	-2,497	232,191	,013
	Experienced	118	20,57	1,02			
Wiki	Inexperienced	158	14,65	,69	-,793	279	,429
	Experienced	123	15,35	,77			
Image Sharing	Inexperienced	157	26,62	1,02	-1,023	279	,307
	Experienced	124	27,90	1,06			
Document Sharing	Inexperienced	161	24,60	1,08	-1,564	281	,119
	Experienced	122	26,64	1,10			
Social Network	Inexperienced	153	36,25	1,08	-2,109	270	,036
	Experienced	119	38,98	1,02			
Instant Messaging	Inexperienced	161	33,31	,80	-1,382	281	,168
	Experienced	122	34,63	,79			

An independent-samples t-test was conducted to compare web 2.0 tools usage expertise level by participants' computer usage experience in table 6. According to the results there was a significance difference in expertise level of blog usage by experienced user (M=20,57, SD=1,02) and inexperienced participants (M=17,63, SD=0,90); $t_{(232,191)}$=-2,491, p=0.013. There was a significance difference in expertise level of social network site usage by level by experienced user (M=38,98, SD=1,02) and inexperienced participants (M=36,25, SD=1,08); $t_{(270)}$=-2,109, p=0.036. Other four web 2.0 tools usage expertise level there is no significance difference by computer usage experience.

Table 7 Science teacher candidates' Web 2.0 tools usage expertise level differences by internet usage experience

		N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Blog	Inexperienced	134	16,74	,87	-3,593	270,724	,000
	Experienced	141	20,81	1,01			
Wiki	Inexperienced	133	14,40	,70	-1,125	276	,262
	Experienced	145	15,38	,75			
Image Sharing	Inexperienced	132	25,61	1,06	-2,430	276	,016
	Experienced	146	28,63	1,01			
Document Sharing	Inexperienced	134	24,48	1,10	-1,581	278	,115
	Experienced	146	26,54	1,09			
Social Network	Inexperienced	126	35,83	1,14	-2,450	267	,015
	Experienced	143	38,99	,98			
Instant Messaging	Inexperienced	136	33,47	,82	-,867	278	,387
	Experienced	144	34,31	,78			

An independent-samples t-test was conducted to compare web 2.0 tools usage expertise level by participants' internet usage experience in table 7. According to the results there was a significance difference in expertise level of blog usage by experienced user (M=20,81, SD=1,01) and inexperienced participants (M=16,74, SD=0,87); $t_{(270,724)}$=-3,593, p=0,000. There was a significance difference in expertise level of image sharing site usage by experienced user (M=28,63, SD=1,01) and inexperienced participants (M=25,61, SD=1,06); $t_{(276)}$=-2,430, p=0,016. There was a significance difference in expertise level of social network site usage by experienced user (M=38,99, SD=0,98) and inexperienced participants (M=35,83, SD=1,14); $t_{(267)}$=-2,450, p=0,015. Other three web 2.0 tools usage expertise level there is no significance difference by computer usage experience.

RESULTS

According to findings science teacher candidates average computer usage experience is 8,08 years and internet usage experience is 6,80 years. In their research Brown & Czerniewicz, (2010) state research group, which can be names as millennial generation, have more than 6 years computer usage experience. Research findings are consistent with their results. In another research which has science teacher candidates as research group, Lei (2009) state that %96,4 of the research group started to use computer before sixth grade. Research findings are also consistent with Lei (2009). This results is proof of research group is digital native. Furthermore almost all of the participants have e-mail and social network account. On the other hand science teacher candidates who have blog and micro-blog account are less.

When we look ate web 2.0 usage experience, science teacher candidates have the most experience in using social network site and after social network sites they have experience concerning instant messaging. They have least experience in wiki and blog usage. To understand experience and demographic attributes some statistical analysis were done. And by gender science teacher candidates experience differ in just two tools: image sharing and document sharing. By computer usage experience science teacher candidates experience differ in social networking site and blog usage and by internet usage experience science teacher candidates experience differ in social networking site, blog and image sharing usage

In a research concerning social network usage, Jones, Ramanau, Cross & Healing (2010) state that research group visit social network sites daily basis. And Kayri & Çakır (2010) state that %31 of the participants visit social network site everyday. Friedla &Vercic (2011) state that the most popular activity concerning internet is visiting social network sites and second popular is watching video online. This research findings is consistent with this research, because science teacher candidates have the most experience in social network usage and after social network site they have experience in instant messaging programs.In their research Kennedy, Dalgarno, Gray, Judd, Waycott, Bennett, Maton, Krause, Bishop, Chang & Churchward (2007) state that %80 of the participants never contributed a wiki and %50 of the participants read or write a blog. Research findings are also consistent with their results.

Research findings show that science teacher candidates experience regarding each tool fairly equal and their

experience do not differ notable level by gender, computer experience or internet experience. Experience concerning the tools which science teacher candidates use in their daily lives is fairly higher than the tools they do not use in their daily lives. Their experience level can promote by assignment and teaching activities which require using different web 2.0 tools in their teaching experience. Mazman & Koçak Usluel (2011) state that participants social network usage differ by gender.

Wiki, blog and other web2.0 tools are cooperative learning tools for the science classroom. Tilfarlioglu (2011) state that Web 2.0 applications serve as a good learning tool. Hakverdi-Can & Dana (2012) state that students' use of technology in their science classroom is highly correlated with the frequency of their science teachers' use of computer applications/tools. Faculty should provide example activities concerning web 2.0 tools in their class to ensure that science teacher candidates will use these tools effectively.

REFERENCES

Aharony, N.(2009). The influence of LIS students' personality characteristics on their perceptions towards Web 2.0 use. Journal of Librarianship and Information Science. 41. Pp: 227 - 242 . DOI: 10.1177/0961000609345088

Brown, C. &Czerniewicz, L. (2010). Debunking the 'digital native': beyond digital apartheid, towards digital democracy. Journal of Computer Assisted Learning. 26. Pp: 357–369

Cain, J. & Fox, B. I. (2009). Web 2.0 and Pharmacy Education.American Journal of Pharmaceutical Education. 73 (7) .pp: 1 – 11.

Chen, S., Yen, D. C. & Hwang, M. I. (2012). Factors influencing the continuance intention to the usage of Web 2.0: An empirical study. Computers in Human Behavior, In Press, doi: 10.1016/j.chb.2011.12.014

Cifuentes, L., Sharp, A., Bulu, S., Benz, M. &Stough, L. M.(2010). Developing a Web 2.0-based system with user-authored content for community use and teacher education. Education Technology Research Development. 58. Pp: 377–398. DOI 10.1007/s11423-009-9141-x

Coutinho, C. &Mota, P. (2011). Web 2.0 Technologies in Music Education in Portugal: Using Podcasts for Learning. Computers in the Schools.28(1).Pp: 56-74. http://dx.doi.org/10.1080/07380569.2011.552043

Friedla, J. &Vercic, A. T. (2011). Media preferences of digital natives' internal communication: A pilot study. Public Relations Review. 37. Pp: 84–86

Grosseck, G.(2009). To use or not to use web 2.0 in higher education?.Procedia Social and Behavioral Sciences. 1.Pp: 478–482

Gui, M. &Argentin, G. (2011). Digital skills of internet natives: Different forms of digital literacy in a random sample of northern Italian high school students. New Media & Society.13(6).Pp: 963–980.

Hakverdi-Can, M. & Dana, T. M. (2012).Exemplary Science Teachers' Use Of Technology. TOJET: The Turkish Online Journal of Educational Technology – January 2012, 11(1), 94 – 112.

Jones, C., Ramanau, R., Cross, S. & Healing, G. (2010). Net generation or Digital Natives: Is there a distinct new generation entering university?.Computers & Education. 54. Pp: 722–732

Kayri, M. & and Çakır, Ö. (2010). An Applied Study On Educational Use Of Facebook As A Web 2.0 Tool: The Sample Lesson Of Computer Networks And Communication. International Journal Of Computer Science & Information Technology.2(4).Pp: 48 – 58. DOI : 10.5121/ijcsit.2010.2405

Kennedy, G., Dalgarno, B., Gray, K., Judd, T., Waycott, J., Bennett, S., Maton, K., Krause, K., Bishop, A., Chang, R. &Churchward, A. (2007). The net generation are not big users of Web 2.0 technologies: Preliminary findings. ASCILITE Conferences 2007 Proceeding Book.Pp: 517 - 525

Kitsantas, A. &Dabbagh, N. (2011). The Role of Web 2.0 Technologies in Self-Regulated Learning. New Directions For Teaching And Learning. 126. Pp: 99 -106. DOI: 10.1002/tl.448

Kolikant, Y. B. (2010). Digital natives, better learners? Students' beliefs about how the Internet influenced their ability to learn. Computers in Human Behavior. 26. Pp: 1384–1391

Lei, J. (2009). Digital Natives As Preservice Teachers: What Technology Preparation Is Needed?.Journal of Computing in Teacher Education.25(3).Pp: 87 - 97

Liu, X., Liu, H., Bao, Z., Ju, B. & Wang, Z. (2010). A web-based self-testing system with some features of Web 2.0: Design and primary implementation. Computers & Education, 55, 265–275.

Martin, R., Sexton, C &Franklin,T. (2009). Teaching Science for All Children: An Inquiry Approach. Fifth Edition. Allyn And Bacon.

Mason, R. &Rennie, F. (2007). Using Web 2.0 for learning in the community. Internet and Higher Education. 10. Pp:196–203

Mazman, S.G. &KoçakUsluel, Y. (2011).Gender Differences In Using Social Networks. TOJET: The Turkish Online Journal of Educational Technology – April 2011, 10(2). 133 – 139.

MEB. (2005). Fen veTeknoloji 4 – 8 SınıflaröğretimProgramıveKlavuzu.http://ttkb.meb.gov.tr

Oliver, K. (2007). Leveraging Web 2.0 in the Redesign of a Graduate-Level Technology Integration Course. TechTrends, 51(5). 55 – 61.

Prensky, M. (2001). Digital Natives, Digital Immigrants Part 1. On the Horizon.9(5).Pp: 1 – 6.
Ras, E. &Rech, J. (2009).Using Wikis to support the Net Generation in improving knowledge acquisition in capstone projects. The Journal of Systems and Software. 82. Pp: 553–562
Székely, L. & Nagy, Á. (2011). Online youth work and eYouth — A guide to the world of the digital natives. Children and Youth Services Review. 33. Pp: 2186–2197.
Tilfarlioglu, F. Y. (2011). An International Dimension Of The Student's Attitudes Towards The Use Of English In Web 2.0 Technology. TOJET: The Turkish Online Journal of Educational Technology – July 2011, 10(3), 63 – 68.
Valtonen, T., Dillon, P., Hacklin, S. &Vaisanen. P. (2010).Net generation at social software: Challenging assumptions, clarifying relationships and raising implications for learning. International Journal of Educational Research. 49. Pp: 210–219
Wu, S., Wang, S., Liu, E. Z., Hu, D. & Hwang, W. (2012).The Influences Of Social Self-Efficacy On Social Trust And Social Capital – A Case Study Of Facebook. TOJET: The Turkish Online Journal of Educational Technology – April 2012, 11 (2), 246 – 254